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I. INTRODUCTION

The Board of Regents, The University of Texas System (“UT”) and 3D Systems, Inc. (“3D Systems”), respectfully submit this brief responding to the constructions proposed and arguments made by defendant EOS GmbH Electro Optical Systems (“EOS”) in its Corrected Opening *Markman* Brief (“EOS Brief”).¹ Plaintiffs first address the “heating” step limitation in the ‘070 patent and the “temperature control means” limitation in the ‘589 patent, as both Opening Briefs seek their construction. Plaintiffs then address each of the additional claim terms EOS wants construed or, for the term “a temperature below the sintering temperature,” wants declared fatally indefinite. As shown below, EOS’s proposed constructions — and its purported inability to construe one of the terms — are at odds with both the facts and the law.

The first line of the EOS Brief correctly states that “[t]he *Markman* process begins with the claims.” EOS then departs from that basic tenet of claim construction and the “heavy presumption” that claim terms have their ordinary meaning (*Texas Digital Sys. v. Telegenix, Inc.*, 308 F.3d 1193, 1202-03 (Fed. Cir. 2002)), conspicuously avoiding any discussion of the plain meaning of the claim language throughout the rest of its Brief. Nowhere does EOS even mention the ordinary meaning of the words “heating” and “moderating,” even though they are key claim limitations. Indeed, the EOS Brief never cites to a dictionary definition for *any* claim term, even though the most recent opinions from the Federal Circuit say that is the proper starting point for analysis. *E.g., id.*

¹ A Joint Claims Chart showing all of the proposed constructions is attached as Exhibit 15 to the Supplemental Declaration of Robert W. Dickerson filed concurrently (“Supp. Dickerson Decl.”). Citation to the initial Declaration of Robert W. Dickerson filed with plaintiffs’ Opening *Markman* Brief is distinguished as “Dickerson Decl.,” and plaintiffs’ exhibits are consecutively numbered, so the first exhibit submitted with the Supp. Dickerson Decl. is Exhibit 15.

EOS compounds this fundamental mistake by ignoring whole claim phrases altogether.

For instance, compare EOS's recitation of the "function" stated in the "temperature control means" limitation in claim 1 of the '589 patent with what the claim actually says:

EOS: "In the present case, the function [of the temperature control means limitation] is: moderating the temperature difference between unfused powder in a topmost layer of powder and fused powder (i.e., the part being created) below." (EOS Brief, p. 3.)

Claim 1: "temperature control means for moderating the temperature difference between unfused powder in a topmost layer of powder *at the target surface* and fused powder *in the one of the plurality of layers of powder immediately beneath the topmost layer*."

Incredibly, EOS just ignores the ***bold, italicized*** phrases, which it must do in order to make the specious argument that the "temperature control means" has to address problems both at the Curl Interface and the Growth Interface.² In that artificial void, EOS blatantly rewrites the second highlighted phrase to mean "fused powder (i.e., the part being created) below" in an attempt to make the claim refer to the Growth Interface, which underscores the length to which EOS has had to go in order to find support for its proposed constructions. Without question, the claim language EOS has deleted — "*at the target surface*" and "*in the one of the plurality of layers of powder immediately beneath the topmost layer*" — refers only to the Curl Interface, and excludes the Growth Interface. To avoid the plain and ordinary meaning of those terms, EOS simply ignores them on its path to a through-the-looking-glass proposed construction where literally "heat" would also have to mean "cool," and "topmost layer" would also have to mean "bottommost layer."

In short, having eschewed the claim language, EOS's proposed constructions rely almost entirely on a tertiary source, the patents' file histories. Even then, EOS cites only to isolated

² The coined terms "Curl Interface" and "Growth Interface" are described in plaintiffs' Opening *Markman* Brief, at p. 4 n.8, and graphically depicted in Exhibit 4 to the Dickerson Declaration (filed Oct. 27, 2003).

snippets of the file histories rather than all of the relevant passages that, when fairly examined, require the Court to reject EOS's tortured constructions.

II. THE "HEATING" STEP IN THE '070 PATENT

The parties' proposed constructions are juxtaposed on the Joint Claims Chart. (Supp. Dickerson Decl., Ex. 15.) EOS wants the "heating" step construed to require use of the entire downdraft system that is shown and described as the preferred embodiment in the '070 patent (Ex. 15, pp. 3-5), based on two fallacious arguments: (i) file history disclaimer limits the claim to a method that addresses both curl and growth (EOS Brief, pp. 13-14); and (ii) the "heating" step is in step-plus-function format, and thus should be limited to a method that utilizes the entire structure shown in the specification. (*Id.*, pp. 18-19.)

A. File History Disclaimer Does Not Apply.

In support of this argument, the EOS Brief cites one statement by the Examiner and one selectively cropped statement by the patent applicant to argue that any construction that does not simultaneously address both curl and growth was disclaimed:

The examiner issued a Final Office Action rejecting the claims. Exh. D, pp. 158-163. Applicant had argued that the Arcella prior art failed to disclose the claimed "heating," to which the Examiner responded:

"This argument is not persuasive. Arcella recites that it may be desirable to heat the powder prior to fusing the powder with the laser. Although, Arcella et al. does not disclose that the heating is done to moderate the temperature difference between the second layer of powder and fused portions of the first layer of powder therebeneath, it is submitted that any heating step would provide such 'moderation.'"

Exh. D, at p.161 (emphasis added).

The Applicant then added a new argument (new to this file history, although already presented in the '589 file history), now clarifying the intended scope of the claim by admitting that the removal of bulk heat from the sintered article was also to be achieved by "heating to moderate":

Other beneficial effects are also enabled by the method of claim 8, including the removal of bulk heat from the article which prevents growth of the article into the surrounding unfused powder. The benefits of the invention of claim 8 and its dependent claims have enabled the commercial fabrication of articles with acceptable accuracy, over a wide range of materials.

Exh. D, at pp. 178-179 (emphasis added). With this limitation and concession, as in the case of the '589 patent, the claims were then allowed.

Accordingly, this claim step must be construed to require at least (1) heating the top layer of unfused powder and (2) removing bulk heat from the fused powder."

(EOS Brief, pp. 13-14 (emphasis in original).) As plaintiffs discussed in their Opening *Markman* Brief (at p. 12), the applicant did refer once to "growth" being enabled by issued claim 1, which is the one prosecution history reference the EOS Brief acknowledges. But the complete picture leads to a different conclusion than the one urged by EOS.

First, the applicant did not amend then pending claim 8 (issued claim 1) in any way to refer to "***removing bulk heat***," or to refer to any location other than the Curl Interface, or to add any language that even remotely suggested that "***heating***" would also mean "***cooling***," or that "***moderate***" would also mean "***increase***." Yet, that is how EOS wants the Court to improperly rewrite this claim.³

Second, nowhere did the applicant say anything that comes close to a clear disavowal. The "***other beneficial effects***" statement made by the applicant and quoted by EOS is simply not sufficient, even standing alone, to constitute such a disavowal. But it doesn't stand alone. It was a single, gratuitous, unnecessary, and inaccurate statement that is entirely inconsistent with the other statements the applicant made, both before and after it in the same Amendment (as well as

³ See *York Prods., Inc. v. Central Tractor Farm & Family Ctr.*, 99 F.3d 1568, 1575 (Fed. Cir. 1996) ("Unless altering claim language to escape an examiner rejection, a patent applicant only limits claims during prosecution by clearly disavowing claim coverage.").

the rest of the prosecution history), which confirm that claim 1 deals exclusively with curl, and not growth.

Immediately before the “*other beneficial effects*” sentence EOS cites, the applicant plainly referred only to the Curl Interface, only to heating, and only used “moderate” in the sense of “to lessen” the temperature difference between layers at the Curl Interface:

As described in the specification, . . . the heating of the deposited second layer of powder serves to moderate the temperature difference between the newly-deposited second layer of powder and the previously-formed article being produced, reducing thermal shrinkage in the article. (EOS Ex. D at UT3D 000178.)

And the applicant reiterated this same point repeatedly in the same Amendment, without ever referring to growth or to anything other than adding heat to lessen the temperature difference between layers at the Curl Interface:

Further, Applicant respectfully submits that there is no disclosure in the Arcella et al. reference of the step of, after the depositing step, heating the deposited layer of powder to moderate the temperature difference between the second layer of powder and fused portions of the first layer of powder therebeneath, as required by amended claim 8. (*Id.* at UT3D 000180.)

However, the Arcella et al. reference teaches only the heating of fluidized powder, and nowhere discloses the heating of a second layer of powder after it has been deposited over the first layer of powder, as required by proposed amended claim 1 [*sic*, claim 8]. (*Id.*)

Accordingly, Applicant respectfully submits that the prior art lacks any suggestion to modify the teachings of the Arcella et al. reference so as to heat a second layer of powder after it is deposited upon both fused and remaining unfused portions of a first layer of powder, as required by proposed amended claim 8. (*Id.* at UT3D 000181.)

In addition, Applicant respectfully submits that the benefits provided by the method of proposed amended claim 8 further support its patentability and that of its dependent claims. As noted above, the invention of proposed amended claim 8 proves the important advantage of preventing undesirable shrinkage of the article by moderating the temperature difference between the unfused powder in a new-deposited layer and the underlying

article. Especially considering that any heating performed in the Arcella reference is of fluidized powder rather than of powder deposited over a previously fused and unfused layer, nowhere does the Arcella et al. reference anywhere disclose or suggest that a temperature difference may exist between newly deposited unfused powder and the article being formed, much less suggest the modification of its teaching to address this problem as does the invention of proposed amended claim 8. (*Id.*)

Over and over again, the applicant repeatedly referred only to the Curl Interface, and only to adding heat to lessen the temperature differential between the layers there.

Third, in that same Amendment, the applicant made clear that the limitations added in then pending claims 20 and 21 (issued claims 5 and 6) regarding exhausting a heated gas from below the target surface instead addressed the problem of growth:

The Examiner asserts, without support from any reference, that the specific location of the exhaust conduit is an obvious matter of design choice. Applicant respectfully traverses the rejection of claim 21 to the extent based upon this conclusory assertion, on the grounds that important additional benefits are provided by the exhaust of the heated gas from below the target surface. Attention is directed, in this regard, to the specification . . . which discloses that the removal of bulk heat from the article reduces its bulk temperature, and prevents unwanted “growth” of the article into the surrounding unfused powder. (*Id.* at UT3D 000182.)

Fourth, not once did the Examiner ever mention, much less require, any amendment to any of the pending claims to add language that referred to growth or the problems of removing bulk heat from the part bed. To the contrary, all of the Examiner’s comments regarding the “heating” step dealt with the addition of heat, and not its removal. (*Id.* at UT3D 000160-63.)

In sum, during prosecution, the focus of claim 1’s “heating” step always was on adding heat to moderate (*i.e.*, lessen) the temperature difference between layers at the Curl Interface. The applicant’s one comment about growth that EOS cites, when placed in context, does not “clearly and unmistakably” use “words of manifest exclusion or restriction,” disavowing claim

scope.⁴ Which brings us full circle to the language of claim 1, which contains no reference to the problem of growth or its prevention by removing bulk heat. EOS's avoidance of critical terms, substituting in their place words that refer to the part bed, is erroneous. *Resonate, Inc. v. Alteon Websystems, Inc.*, 338 F.3d 1360, 1367 (Fed. Cir. 2003) ("Therefore, without explicit claim language relating to the bottleneck problem, we see no reason why the invention as recited in claim 6 must include the bypass feature described in the written description as a solution to that problem.").

B. The "Heating" Step is Not in Step-Plus-Function Format, and Thus Should Not Be Construed Under 35 U.S.C. § 112, ¶ 6.

EOS also improperly asserts that the "heating" limitation should be construed under step-plus-function law.⁵ As discussed in plaintiffs' Opening *Markman* Brief (at pp. 7-8), claim 1 recites a method "comprising the steps of" and not "comprising the steps for." Thus, there is no presumption that Section 112, paragraph 6 applies to claim 1. *See Masco Corp. v. United States*,

⁴ Prosecution history disclaimer requires that a patent applicant have used "words or expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope." *ACTV, Inc. v. Walt Disney Co.*, No. 024491, 2003 U.S. App. LEXIS 20498, at * 22 (Fed. Cir. Oct. 8, 2003). In contrast, an "applicant's inaccurate statement cannot override the claim language itself, which controls the bounds of the claim." *Storage Tech. Corp. v. Cisco Sys., Inc.*, 329 F.3d 823, 832 (Fed. Cir. 2003).

⁵ Step-plus-function law is rarely applied. EOS cites to *Seal-Flex, Inc. v. Athletic Track & Court Constr.*, 172 F.3d 836, 850 (Fed. Cir. 1999) (Rader, J., concurring), which did not apply step-plus-function law to method claims. Indeed, in Judge Rader's concurrence, he cited only two examples where, in his opinion, the court applied step-plus-function law to a method claim.

In the more recent of those two cases, which EOS also cites, the court in *In re Roberts*, 470 F.2d 1399, 1402 (C.C.P.A. 1973), held that "there is no support, either in the actual holdings of prior cases or in the statute, for the proposition, put forward here, that 'functional' language, in and of itself, renders a claim improper." Thus, the court merely held that claims should not be rejected for containing functional language. Importantly, the court made no claim construction findings, such as whether sufficient acts were recited in the functional language to avoid step-plus-function law.

EOS also cites *Cummins-Allison Corp. v. Glory, Ltd.*, No. 02 C 7008, 2003 U.S. Dist. LEXIS 15746 (N.D. Ill. Sept. 2, 2003), which involved a patent for currency counting equipment. Unlike the claim language here, the claim element found in *Cummins-Allison* to be in step-plus-function format merely recited "automatically denominating bills of a plurality of U.S. denominations" without explaining how the bills were automatically denominated, and no other claim elements discussed this denominating step. Even with this purely functional language, the district court still found the application of § 112, ¶ 6 "a close call." *Id.* at *28.

303 F.3d 1316, 1326-27 (Fed. Cir. 2002).⁶ Moreover, the “heating” step of claim 1 recites acts and explains how the heating function is performed: it moderates the temperature difference at the Curl Interface by “heating the second layer of powder to a temperature below the sintering temperature of the powder.” Thus, step-plus-function law does not apply. *See O.I. Corp. v. Tekmar Co. Inc.*, 115 F.3d 1576, 1583 (Fed. Cir. 1997) (“If we were to construe every process claim containing steps described by an ‘ing’ verb, such as passing, *heating*, reacting, transferring, etc. into a step-plus-function limitation, we would be limiting process claims in a manner never intended by Congress.”) (emphasis added).

C. The Ordinary Meaning Controls the “Heating” Step Construction.

As discussed in plaintiffs’ Opening *Markman* Brief (at pp. 8-11), the ordinary meaning of “heating” controls, and is supported by the surrounding language, other claims, and the doctrine of claim differentiation. The claim is all about heating: *what* gets heated, *why* it gets heated, *where* it gets heated, and *how much* it gets heated. There is no cooling (or removal of bulk heat) whatsoever required by the ordinary meaning.

III. “TEMPERATURE CONTROL MEANS” IN THE ‘589 PATENT

Again, the parties’ proposed constructions are juxtaposed on the Joint Claims Chart. Although the parties agree that this claim term is in means-plus-function format, EOS wants it construed as limited to the entire downdraft structure shown in Fig. 11; plaintiffs assert that it

⁶ The Patent Office *Manual of Patent Examining Procedure* (“MPEP”) is instructive: A claim limitation will be interpreted to invoke 35 U.S.C. 112, sixth paragraph if it meets the following 3-prong analysis: (A) *the claim limitations must use the phrase “means for” or “step for”*; (B) the “means for” or “step for” must be modified by functional language; and (C) the phrase “means for” or “step for” must not be modified by sufficient structure, material or acts for achieving the specified function.

MPEP § 2181 (rev. Feb. 2003) (emphasis added) (Supp. Dickerson Decl., Ex. 16).

should be construed to mean the heater disclosed in the patent *and its equivalents*.⁷ (Dickerson Decl., Ex. 15, pp. 7-8.)

A. The Function of the “Temperature Control Means” Is To Heat the Newly Deposited Powder And Not to Cool the Part Bed.

As discussed in the Introduction above (at p. 2), EOS’s entire argument is premised upon its own rewriting of the express function in this claim limitation. The language EOS ignores, however — “*at the target surface*” and “*in the one of the plurality of layers of powder immediately beneath the topmost layer*” — indisputably refers only to the Curl Interface, and just as indisputably excludes the Growth Interface. This omission shows that EOS’s proposed construction is flawed.

Moreover, the function that is explicitly recited in the claim does not support EOS’s proposed construction.⁸ Although the specification discloses the entire downdraft system as its preferred embodiment, this does not mean that the claims should be limited to it.⁹ Claim 1 only recites a “temperature control means for moderating the temperature difference,” and only at the Curl Interface. This function does not require any bulk heat removal. Indeed, EOS admits that shrinkage (*i.e.*, curl) and growth are prevented by *separate* functions: “‘Shrinkage’ is said to be avoided by *providing heat* to the top layer of powder, and ‘growth’ is prevented by *removing*

⁷ “*Equivalents*” comes directly from 35 U.S.C. § 112, ¶ 6, and is ignored entirely by EOS in its proposed constructions. Thus, even if the “corresponding structure” were to include the fan and exhaust, any equivalent structure that accomplished the goal of “heating” the topmost layer to prevent curl would still literally infringe under Section 112, paragraph 6.

⁸ See *Micro Chem. v. Great Plains Chem. Co., Inc.*, 194 F.3d 1250, 1258 (Fed. Cir. 1999) (“The statute does not permit limitation of a means-plus-function claim by adopting a function different from that explicitly recited in the claim.”); *ACTV, Inc.*, 2003 U.S. App. LEXIS 20498, at *11 (“Correctly identifying the claimed function is critical, because ‘an error in identification of the function can improperly alter the identification of the structure . . . corresponding to that function.’”) (quotation omitted).

⁹ See *Northrop Grumman Corp. v. Intel Corp.*, 325 F.3d 1346, 1352 (Fed. Cir. 2003) (“A court may not import into the claim features that are unnecessary to perform the claimed function.”).

bulk heat from the article being produced.” (EOS Brief, p.3 (emphasis added).) The mere fact that the specification addresses both problems does not limit the claims.¹⁰

EOS also attempts to rely on the prosecution history to improperly narrow the ordinary meaning of “temperature control means,” but again fails to provide the full and complete picture of what transpired. Although the applicant did refer to growth in the prosecution history, these statements were not the basis for distinguishing the cited art and thus do not create a “clear and unmistakable disclaimer.”¹¹ Thus, despite references to growth, the entire prosecution history for the ‘589 patent reflects that the “temperature control means” limitation does not include the function of preventing “growth.”

B. The Temperature Control Means Structure Is A Heater and its Equivalents.

Once the claimed function is correctly identified, the corresponding structure that performs the function must be determined. *See Northrop Grumman*, 325 F.3d at 1352;

¹⁰ *See Resonate Inc.*, 338 F.3d at 1367 (where a written description sets out two different problems present in the prior art, it is not necessary that the invention claimed, and thus every claim in the patent, address both problems); *Sunrace Roots Enter. Co. v. SRAM Corp.*, 336 F.3d 1298, 1304-05 (Fed. Cir. 2003) (where specific claims do not recite all of the stated goals, “the written description should not be used to narrow the ordinary meaning of the claim limitation”); *Prima Tek II, L.L.C. v. Polypap, S.A.R.L.*, 318 F.3d 1143, 1151-52 (Fed. Cir. 2003) (“It is also well established that broad claims supported by the written description should not be limited in their interpretation to a preferred embodiment.”).

¹¹ EOS claims that the applicant referred to growth three times: “Applicant’s thrice-repeated and *consistent* representations.” (EOS Brief, p. 5 (emphasis added).) Actually, there were four references in the file history to “growth” (Dickerson Decl., Ex. 11), but they were hardly consistent. Rather, as with the ‘070 patent file history, they were entirely inconsistent with other statements that focused on curl and the Curl Interface, and that repeatedly referred only to adding heat. (*See id.*). Moreover, the statements about growth were not necessary to distinguish over the Arcella prior art reference, and were never cited as the basis for distinguishing the prior art, but rather as an “additional benefit” that the invention provided. Indeed, the applicant never said that the invention was patentable because the prior art did not remove heat from the part bed to prevent growth. Nor was there ever an amendment to the claims that in any way added limitations directed to removing heat, to the Growth Interface, or to preventing growth. Instead, the applicant repeatedly pointed to how the invention addressed the problem of a temperature difference at the Curl Interface by adding heat, and that was where the Examiner’s comments were consistently focused as well. On this record, the statements do not rise to a disclaimer. *See Cordis Corp. v. Medtronic AVE, Inc.*, 339 F.3d 1352, 1360-61 (Fed. Cir. 2003) (finding no “clear and unmistakable” disclaimer because the patent applicant did not suggest a variation in the prior art was the “basis for distinguishing his invention.”); *Pickholtz v.*

Chiuminatta Concrete Concepts, Inc. v. Cardinal Indus., Inc., 145 F.3d 1303, 1308-09 (Fed. Cir. 1998). Relying on the disclosure in column 6, EOS contends that the downdraft air system of Fig. 11 is the only structure in the '589 patent that is linked to the claimed function of moderating a temperature difference between unfused and fused powder. (EOS Brief, p. 7.) EOS asserts that because this preferred embodiment performs both functions of adding heat to the Curl Interface and removing heat from the Growth Interface, the structure must include the entire downdraft system. (*Id.*, pp. 8-9.) However, EOS has improperly concluded that the "temperature control means" function includes preventing growth, and thus the corresponding structure EOS proposes for the "temperature control means" is also wrong. Removing bulk heat is not a required function, and thus none of the extra structure of the downdraft system that performs that function, namely the fan and exhaust system, is required structure.

In sum, under Section 112, paragraph 6, "temperature control means" is not limited to the heater **and** the fan and exhaust, but instead should be construed to be only that structure which provides the heat — a heater and its equivalents.

IV. **THE OTHER CLAIM TERMS EOS WANTS CONSTRUED IN THE '589 PATENT**

EOS proposes several additional phrases for construction, all of which deviate from their ordinary meaning. Although plaintiffs believe that none of these phrases require construction, plaintiffs have proposed in the Joint Claims Chart their own construction in the event the Court decides to construe any of these phrases. (*See Supp. Dickerson Decl.*, Ex. 15.)

(continued...)

Rainbow Techs., Inc., 284 F.3d 1365, 1373 (Fed. Cir. 2002) (no disclaimer where the patent applicant was "casual and gratuitous" in making arguments to distinguish over the prior art).

A. “Part”

EOS’s Proposed Construction: EOS apparently seeks to narrow the meaning of “part” by incorporating the word “complete” as an adjective. (See EOS Brief, p. 19 (“part” is a “complete, separable article or component of something”).)

Plaintiffs’ Proposed Construction: If construed, “part” should have its ordinary meaning, consistent with the other claim language and the specification, as “any article comprising two or more sintered layers or cross-sections.”

EOS cites from the specification to support its construction: (i) “The invention is a layer-wise process in which the layers are joined together until the *completed part* is formed”; and (ii) “The control mechanism operates the laser to selectively sinter sequential layers of powder, producing a *completed part* comprising a plurality of layers sintered together.” (EOS Brief, p. 19 (emphasis added).) Applying these references to EOS’s proposed construction of the word “part” yields a redundancy: a part is a “completed, complete part.” The words “complete” and “completed” as used in the quoted passages from the specification do not define part, but merely show that in the preferred embodiment the process is intended to be continued until the article being built is completed.¹²

There are many definitions and common understandings of the word “part,”¹³ but in the context of this patent it simply means an article comprising two or more sintered layers or cross-

¹² EOS’s inclusion in its proposed construction of both “separable article” and “component of something,” in addition to lacking support in the record, would also seem to be unnecessary references to the “two halves of the whole.” “Separable articles” and “components of something” literally would include anything that can be built in a laser sintering machine. If EOS is attempting to limit the definition in some way to exclude parts that can be built on a laser sintering machine, it is not clear from this proposed construction, and would certainly not be appropriate as there is nothing in the claims, the specification or the file history to support such a construction.

¹³ For example, in one dictionary, the definitions of “part” take up over two columns of very small print. (Supp. Dickerson Decl., Ex. 18.) In another, “part” has definitions that include “an essential portion or integral element” and “one of several or many equal units of which something is composed.” (*Id.*, Ex. 17.) An ordinarily skilled person will understand that “part”

sections. The specification supports this construction: “That is, *a part is considered a plurality of discrete cross-sectional regions* which cumulatively comprise the three-dimensional configuration of the part.” (‘070 patent, col. 7:9-13; ‘589 patent, col. 7:15-18 (emphasis added).) The ordinary meaning of “plurality” is “the state of being plural.” (Supp. Dickerson Decl., Ex. 17.) Thus, plurality means two or more.¹⁴ Thus, a “part,” as used in claim 1, can be as little as two sintered layers. In addition, the claims and specification repeatedly refer to building the part in layers. Claim 9 of the ‘070 patent recites that method claim 1 may be repeated, such that a plurality of layers (*i.e.*, more than two) can be added layer-by-layer onto the already formed plurality of layers. Thus, if construed, the Court should reject EOS’s invitation to import narrowing limitations into the broad, ordinary meaning of “part,” and, for purposes of clarity, should construe “part” to mean simply “an article comprising two or more sintered layers or cross-sections.”

B. “Means for Successively Dispensing a Plurality of Layers of Powder at a Target Surface”

EOS’s Proposed Construction: EOS seeks to limit this phrase to correspond to the entire counter-rotating drum assembly illustrated in Figs. 9 and 10 in the ‘589 patent.

Plaintiffs’ Proposed Construction: If construed, the phrase should be interpreted to cover a powder dispenser, such as that disclosed in Fig. 1, or a powder dispenser with drum, such as that disclosed in Figs. 9 and 10, and their equivalents.

EOS’s proposed construction is based upon the untenable position that the powder dispenser illustrated in Fig. 1 deposits only a mound of powder, and thus does not dispense a

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and “article” in the laser sintering industry refer broadly to anything that can be built a laser sintering machine or with the laser sintering process.

¹⁴ See *Dayco Products, Inc. v. Total Containment, Inc.*, 258 F.3d 1317, 1327-28 (Fed. Cir. 2001) (“In accordance with standard dictionary definitions, we have held that ‘plurality,’ when used in a claim, refers to two or more items, absent some indication to the contrary.”).

layer of powder. (EOS Brief, p. 10 n.9.) Yet nowhere does the specification indicate that Fig. 1's powder dispenser deposits powder in a mound, let alone a mound at one end of the part bed. To the contrary, the specification discloses that the powder dispenser in Fig. 1 successively dispenses a plurality of layers, as evidenced by the Patent Office's issuance of an earlier, related patent in which only Fig. 1's powder dispenser was disclosed, before the counter-rotating drum assembly illustrated in Figs. 9 and 10 was added.¹⁵ Thus, there are two different embodiments disclosed in the patents-in-suit for "dispensing" a powder layer. And, because the language of claim 1 thus covers two different sets of corresponding structure, they must be construed as alternative limitations; claim 1 cannot be limited to only one of them.¹⁶ The doctrine of claims differentiation also supports this construction.¹⁷ If construed, the Court should reject EOS's attempt to ignore the separate, distinct embodiment shown in Fig. 1, and interpret this claim language to mean either a powder dispenser like the one disclosed in Fig. 1, or a powder dispenser with drum like the one disclosed in Figs. 9 and 10, and their equivalents.

¹⁵ Both patents-in-suit claim priority to an earlier patent, U.S. Patent No. 4,863,538 (the "538 patent"). (Supp. Dickerson Decl., Ex. 19.) The '538 patent is directed to an "invention [that] relates to a computer aided laser apparatus which *sequentially sinters a plurality of powder layers* to build the desired part in a layer-by-layer fashion." (*Id.*, col. 1:9-12 (emphasis added).) To deposit this plurality of powder layers, the '538 patent discloses powder dispenser 14 in Fig. 1 — the same powder dispenser and the same Fig. 1 disclosed and illustrated in the patents-in-suit. The '538 patent, like the specification in the patents-in-suit, further discloses how the laser is modulated to selectively sinter "*a layer of powder dispensed*" in the target area, and further, how a laser selectively sinters "*sequential layers of powder*" to produce a part comprising a plurality of layers sintered together. (*Id.*, col. 2:45-53 (emphasis added).) The '538 patent continues, again like the patents-in-suit, to disclose how a first portion of powder is deposited from the powder dispenser and then sintered as a first layer. (*Id.*, col. 3:27-32.) Each sintered layer, which corresponds to a cross-section of the part and preferably has a constant thickness (*id.*, col. 3:33-34), cannot be created if a "mound" of powder simply is deposited at one "end" of the part bed by dispenser 14 in Fig. 1.

¹⁶ See *Serrano v. Telular Corp.*, 111 F.3d 1578, 1583 (Fed. Cir. 1997) ("Disclosed structure includes that which is described in a patent specification, including any alternative structures identified."); *Micro Chem.*, 194 F.3d at 1258-59 (reversing the district court because it overlooked alternative embodiments of the invention, including a more general structure corresponding to the claimed function).

¹⁷ Claim 8 of the '589 patent limits the dispensing means to include a powder dispenser and drum, and thus independent claim 1 is not limited to what dependent claim 8 further defines.

V. **THE OTHER CLAIM TERMS EOS WANTS CONSTRUED IN THE '070 PATENT**

A. **"Part"**

The same position set forth in Section IV.A. above applies here.

B. **The "Depositing" Steps**

EOS's Proposed Construction: EOS wants the depositing "step" to require use of the entire counter-rotating drum assembly illustrated in Figs. 9 and 10.

Plaintiffs' Proposed Construction: If construed, the ordinary meaning of both the depositing steps is to lay down and leave in a non-fluidized arrangement a cross-section of powder.¹⁸

EOS argues that the "depositing" steps in the '070 patent are also in step-plus function format, and therefore must be limited to the use of the counter-rotating-drum assembly depicted in Figs. 9 and 10. (EOS Brief, p. 18.) This argument fails for two reasons: (i) the "depositing" steps are not in the "steps for" format that warrants a step-plus-function construction; and (ii) even if they were, as discussed above in connection with the "means for successively dispensing" limitation, two alternative acts for depositing are shown in the patent: (1) depositing powder in a layer with the dispenser shown in Fig. 1, and (2) depositing a mound of powder at one end of a part bed with a dispenser and then spreading that mound in a smooth even layer across the part bed with a drum, such as the dispenser and drum shown in Figs. 9 and 10.

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See Sunrize Roots, 336 F.3d 1298 at 1304 (when a dependent claim sets forth the particular structure, it broadens the independent claim by virtue of the doctrine of claim differentiation).

¹⁸ There are two depositing steps in claim 1 of the '070 patent: "depositing a first layer of powder at a target surface" and "depositing a second layer of powder over both fused and remaining unfused portions of said first layer of powder after said directing step, so that the second layer of powder is supported by fused and remaining unfused portions of said first layer of powder." These two "depositing" steps should be given consistent constructions. *See Fin Control Sys. Pty, Ltd. v. OAM, Inc.*, 265 F.3d 1311, 1318 (Fed. Cir. 2001) (there is a "presumption that the same terms appearing in different portions of the claims should be given

Claim construction of the “depositing” steps, like all others, begins with the ordinary meaning of the claim language itself. The ordinary meaning of “deposit” is “to lay down: place.” (Supp. Dickerson Decl., Ex. 17.) The claim clarifies that the portion of powder laid down corresponds to a cross-section of the part. The specification also clarifies that each layer corresponds to a cross-section, and preferably has a constant thickness. (’070 patent, col. 3:39-40 (“the first layer corresponds to a first cross-sectional region of the part”); col. 7:14-15 (“the thickness (dimension in the axis 72 direction) of each layer is constant.”).) The ordinary meaning of “layer” is “one thickness, course, or fold laid or lying over or under another.” (Supp. Dickerson Decl., Ex. 17.) Thus, in the context of the claim, the ordinary meaning of the depositing steps of claim 1 is “to lay down and leave in a non-fluidized arrangement a layer of powder in the desired thickness corresponding to the desired cross-section of the part being built.”

This plain meaning construction explains *how* the depositing function (*i.e.*, the act of depositing) is performed: by first “laying down” a cross-section of powder in the desired thickness at a target surface and, for the second depositing step, “laying down” a cross-section of powder in the desired thickness over both fused and remaining unfused portions of the first layer of powder. This plainly is not one of those extremely rare instances where step-plus-function law is applied.

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the same meaning unless it is clear from the specification and prosecution history that the terms have different meanings at different portions of the claims”).

C. “After the Depositing Step”

EOS’s Proposed Construction: EOS contends that “after the depositing step” means “*only* after the *second* depositing step.” In other words, EOS wants the patent limited to a process in which the heating occurs *only* after the *second* depositing step *and at no other time*.¹⁹

Plaintiffs’ Proposed Construction: If construed, this term should be interpreted to mean what it says — “after the depositing step but not *only* after the depositing step.”

Before turning to the basis for EOS’s asserted construction, it is important first to recognize that EOS does not refute that: (i) neither the word “only” nor anything that suggests it is found in the claim; (ii) there is nothing in the specification that says or even suggests that heating has to occur *only* after the second depositing step and at no other time; and (iii) there is no statement by the applicant during prosecution that “heating” has to occur *only* after the depositing step.²⁰ The entire basis for EOS’s attempt to grossly distort and limit this claim term is a single statement by the Examiner, responding to the applicant’s attempted amendment after a Final Rejection, which says, “nor was there a claim which incorporated heating only after the

¹⁹ If the claim were limited as EOS suggests, then EOS would undoubtedly argue at trial that there is no literal infringement if its machines also heat the top layer of powder at any other time. Regardless, EOS would still infringe, because a method patent is infringed even where the accused infringer utilizes more steps than claimed, so long as it is practicing the claimed method. *Stiftung v. Renishaw PLC*, 945 F.2d 1173, 1181-82 (Fed. Cir. 1991).

²⁰ And for good reason. During prosecution, the applicant attempted to distinguish over the Arcella reference. (Dickerson Decl., Ex. 13.) Arcella disclosed a *fluidized* system in which the powder is made to float up (like in a dust storm, an image reminiscent of Marilyn Monroe’s famous billowing skirt) by blowing air up through a porous plate on the bottom of the powder container. The heating means disclosed in Arcella could only heat *all* of this floating powder — either by means of a heater element in the fluidized bed or by heating the air used to fluidize the powder. It was physically impossible for the device disclosed in Arcella to heat just the newly deposited layer. So, the distinction was that heating occurred at the Curl Interface after the powder was deposited, and not in a fluidized state, in the patents-in-suit, as opposed to heating all of the powder indiscriminately, while it was moving about and fluidized, as in Arcella. There was no need to distinguish Arcella by saying heating occurred *only after the depositing step and at no other time*, as EOS now argues.

Moreover, the construction EOS seeks is completely nonsensical from a technical standpoint — the problem of curl does not arise only after the *second* layer is deposited. Instead, it is a concern with each successive layer. EOS’s construction would limit it to addressing curl between the first and second layers only, an obviously absurd result.

second depositing step.” (See EOS Ex. D, at UT3D 000174-75 [Advisory Action].) That response, however, expressly did not relate to the proposed amendments: “Comment on the proposed amendments is inappropriate at this time since the amendments are not being entered. Thus, the rejections are maintained for the reasons of record.” (*Id.* at UT3D 000175, last paragraph.) In other words, the Examiner advised the applicant that the proposed amendment would not be considered for the reasons stated and, most significantly, that *it would be inappropriate to comment on them at that time*. Thus, this Advisory Action was a “non-event” outside of its single purpose — to tell the applicant that his further attempt to file amendments was being rejected. No reasonable person would rely on this off-hand statement in an Advisory Action, nor would it be appropriate for it to override the plain, express language of the claim.²¹ This simply cannot be considered a “clear and unmistakable” disavowal of claim scope by the applicant, which is the standard the case law requires.

VI. INDEFINITENESS SHOULD NOT BE DECIDED DURING MARKMAN BUT, IF CONSIDERED, THE PHRASE “A TEMPERATURE BELOW THE SINTERING TEMPERATURE” IS DEFINITE.

EOS attempts to obtain through the *Markman* process what amounts to summary judgment on the grounds that claim 1 of the ‘070 patent is invalid for indefiniteness under 35 U.S.C. § 112, ¶ 2. The case law is clear that indefiniteness should not be determined during the *Markman* process.²² Indefiniteness is not appropriate during the *Markman* process because it would allow EOS to improperly evade (i) proving invalidity by clear and convincing evidence,²³

²¹ Notably, the Examiner did not reiterate his statement in any subsequent prosecution of the patent application, or require amendments to reflect them.

²² See, e.g., *Intervet Am., Inc. v. Kee-Vet Lab., Inc.*, 887 F.2d 1050, 1053 (Fed. Cir. 1989) (“Ambiguity, undue breadth, vagueness, and triviality are matters which go to claim *validity* for failure to comply with 35 U.S.C. § 112, ¶ 2, not to interpretation or construction.”) (emphasis in original).

²³ The ‘070 patent carries a presumption of validity that can only be rebutted by clear and convincing evidence. *Budde v. Harley-Davidson, Inc.*, 250 F.3d 1369, 1376 (Fed. Cir. 2001); see also *S3 Inc. v. nVIDIA Corp.*, 259 F.3d 1364, 1367 (Fed. Cir. 2001) (presumption includes compliance with the definiteness requirement). This presumption of validity is based at

and (ii) the procedures of Federal Rule of Civil Procedure 56. The Court should decline EOS's invitation to commit reversible error. EOS's argument that this term is indefinite is just one more ill-conceived distraction from an infringer who has already greatly profited outside the United States by riding the coattails of UT and 3D System's predecessor, DTM Corporation.²⁴

Notwithstanding EOS's expert's professed inability to comprehend what "sintering temperature" means, one truly of ordinary skill in the art would understand that—in the context of the '070 patent, and more particularly claim 1 of the '070 patent—it merely refers to the temperature at which those portions of the powder that were scanned by the laser were selectively sintered or fused. The claim language "a temperature below the sintering temperature" is thus a temperature below that "fusing" temperature. It tells the ordinarily skilled person that the newly deposited powder should not be heated to a temperature as high as the powder that was just fused. If it were, the result would be a "blob" of fused material, and not the desired part. This construction is clear from the language of claim 1 itself and the written description.²⁵

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least in part on the assumption that the Examiner, who has a duty to issue only valid patents, has some expertise in interpreting prior art references and is familiar with the level of skill in the art. *Am. Hoist & Derrick Co. v. Sowa & Sons, Inc.*, 725 F.2d 1350, 1359 (Fed. Cir. 1984) *cert. denied*, 469 U.S. 821 (1984).

²⁴ The specious nature of EOS's "indefiniteness" argument is made apparent from the simple fact that the Housholder reference, which EOS discussed at length during the October 17 tutorial as having first taught laser sintering, does not set forth the sintering temperatures for any of the materials it discloses. For that matter, neither does the Arcella reference nor many other issued patents regarding sintering.

²⁵ The Examiner had no difficulty understanding the phrase. During prosecution, the Examiner never rejected the phrase "a temperature below the sintering temperature" as being indefinite. Instead, the only rejection of the "sintering temperature" phrase was that it was anticipated by Arcella: "The process disclosed by Arcella et al. includes . . . heating said powder to a temperature below the sintering temperature[.]" (EOS Ex. D, UT3D 000125.)

Further, because sintering may be carried out over a range of temperatures for any given material system (which Dr. Lightman recognizes),²⁶ one way to define the upper limit on how much to heat the newly deposited, topmost layer to avoid curl while also avoiding premature sintering or fusing of that topmost layer is to use the “sintering temperature” that sintered or fused the prior layer.²⁷ Any temperature at or above that temperature would cause the new layer of powder to fuse indiscriminately across the entire part bed, and not just in response to the laser beam. At bottom, the limitation regarding heating the topmost layer to a “temperature below the sintering temperature” is not indefinite.

VII. CONCLUSION

For each of the reasons set forth above, UT and 3D Systems respectfully request that the Court adopt plaintiffs’ proposed claim constructions and reject those proposed by EOS, including EOS’s assertion of indefiniteness.

²⁶ “[T]he process of sintering does not occur at a specific temperature. Moreover, sintering depends upon many variables beyond temperature, such as particle size distribution, particle shape, and the use of sintering aid additives.” (Lightman Decl., ¶ 9.)

²⁷ Dr. Lightman states that a person of ordinary skill in the art has an engineering degree and several years of experience in the field. (*Id.*, ¶ 6.) That person would have been able to determine, at least as of June 17, 1997 (when the patent issued), what the range of sintering temperatures were for the material they were sintering. *See Texas Digital*, 308 F.3d at 1193, 1202-03 (claims are to be construed as they would have been understood by a person of ordinary skill in the art when the patent issued). And, even if some minor experimentation were needed to determine “sintering temperature,” claim 1 is not rendered indefinite. *See Exxon Research & Eng’g Co. v. United States*, 265 F.3d 1371, 1379 (Fed. Cir. 2001) (mathematical precision or specificity is not required, particularly where the patent makes clear that there are a number of factors involved); *W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1557 (Fed. Cir. 1983) (provided that the claims are enabled, and no undue experimentation is required, the fact that some experimentation may be necessary to determine the scope of the claims does not render the claims indefinite).

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I hereby certify that a true and correct copy of the foregoing document was served in the following manner to the following counsel of record on this 10th day of November, 2003.

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